

Nalco Docket No.: 7726-NES

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REMARKS

This is in reply to the Office Action mailed on July 18, 2006 ("Office Action").

Claims 1-32 are currently pending.

Claims 1,2, 4-8, 12-17, 19, 20, 29 and 31 are rejected under 35 U.S.C. § 102(e) over U.S. Patent 6,569,983 ("Treybig").

Claims 1, 3, 10 and 11 are rejected under 35 U.S.C. § 102(b) over U.S. Patent 4,396,499 ("McCoy").

Claims 26, 27 and 28 are rejected under 35 U.S.C. § 102(b) over U.S. Patent 5,760,108 ("Arora").

Claims 21 and 22 are rejected under 35 U.S.C. § 103(a) over U.S. Patent 6,569,983 ("Treybig") in view of U.S. Published Patent Application No. 2003/0008781 ("Gupta").

Claim 30 is rejected under 35 U.S.C. § 103(a) over U.S. Patent 6,569,983 ("Treybig") in view of U.S. Patent No. 4,830,827 ("Au").

Claims 23 and 24 are rejected under 35 U.S.C. 103(a) over U.S. Patent 6,569,983 ("Treybig") in view of U.S. Patent 5,779,405 ("Bruhnke").

Claims 18 and 32 are rejected under 35 U.S.C. § 103(a) over U.S. Patent 6,569,983 ("Treybig").

Claims 29 and 31 are rejected on the ground of nonstatutory obviousness-type double patenting over claims 1, 2, 8 and 9 of U.S. Patent No. 6,569,983.

Claims 1, 23, 29, 31 and 32 are amended to particularly point out and distinctly claim subject matter which Applicant regards as his invention. Support for this amendment is found in the specification at page 13, lines 26-27.

No new matter is added by this amendment.

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Nalco Docket No.: 7726-NES

Customer No. 000049459

DISCUSSION

The Rejection of Claims 1, 2, 4-8, 12-17, 19, 20, 29 and 31 under 35 U.S.C. § 102(e) over U.S.

Patent 6,569,983

Claims 1, 2, 4-8, 12-17, 19, 20, 29 and 31 are rejected under 35 U.S.C. § 102(e) over U.S. Patent 6,569,983 ("Treybig"). In particular, the Examiner states:

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Treybig discloses a composition for recovering hydrocarbon fluids from a subterranean reservoir. Said composition comprises a branched polyhydroxyetheramine prepared by reacting an amine having two reactive hydrogen atoms with a diepoxide followed by an N-alkylating agent (abstract, Claim 1), said amine can have alkylene oxide functionality (figure g depicts an amine with 2 active hydrogens and alkylene oxide units in its backbone). This amine alone meets the requirements of the polyhydroxyetheramine composition of Claim 1 and the reaction meets the requirements of Claim 29. Without knowing the molecular weight of the polyhydroxyetheramine it is impossible for the Examiner to calculate the weight percent of applicants vs. the volume % disclosed by '983, however since the solvent is water and only 2000 ppm of active material, or polyhydroxyetheramine, is disclosed to be used for treatment (Column 14 line 13) Examiner finds the volume percent of 0.005 to 2 to overlap with a weight percent of 0.005 to 2., thus meeting all the limitations for Claim 1.

The use of diglycidyl esters of diacids for the diepoxide is disclosed in Column 3 Line 3, meeting the requirements for Claim 2, the alkylene oxide functionalized amines are disclosed in figures b, c, f and g (Column 4 and 5), meeting the requirements for Claim 4, the amines having 2 reactive hydrogen atoms are found in figures a, d and e, as required for Claim 5. R, R2 and Z are disclosed in Column 5 Lines 49-52, meeting the requirements for Claim 6. The amine having 2 reactive hydrogen atoms is further disclosed in Column 5 Lines 53 to Column 6 Line 5, meeting the requirements Claim 7, the diglycidyl esters of diacids are disclosed in Column 6 Lines 9-19, meeting the requirements for Claim 8, the use of diglycidyl ether of neopentyl glycol and glycerol are disclosed in Column 3, Line 33-35, meeting the requirements for Claims 12 and 13. The use of 1,2,3,4 diexpoxybutane is disclosed in Column 3 Line 53, as required for Claim 14, the use of diglycidyl ether of dimer acid is disclosed in Column 3 Line 3 as required for Claim 15, the use of

Nalco Docket No.: 7726-NES

Customer No. 000049459

secondary, tertiary and ditertiary amines are disclosed in Column 6 Line 25-29, as required for Claim 16.

Reacting a polyhydroxyetheramine (which has substituents of alkylene oxide and 2 reactive hydrogen groups as shown in figures a-g) with a diepoxide and then reacting that product with an amine having 1 or 2 reactive hydrogen atoms is disclosed in Claim 9 of '983, meeting the requirements for Claims 17 and 31. The use of a mixture of diepoxides and aliphatic or aromatic triepoxides is disclosed in Column 6 Lines 20-24, as required by Claim 19 and the use of an alkylating agent after the reaction of the amine and the mixture of the epoxides is disclosed in Claim 10 of '983, as required for Claim 20.

Office Action at pages 2-4.

Applicant respectfully traverses this rejection.

Applicant respectfully asserts that Treybig discloses a branched polyhydroxyetheramine prepared by reacting an amine having two reactive hydrogen atoms with a diepoxide to form a polyhydroxyetheramine and then reacting the polyhydroxyetheramine with an N-alkylating agent to prepare the branched polyhydroxyetheramine. The N-alkylating agent is a compound of formula $R_{11}X$ where R_{11} is C_5 - C_{25} alkyl or alkenyl where the alkyl or alkenyl is optionally substituted with one or more oxygen atoms. Col. 3, line 65 to col. 4, line 16.

The polymer used in the recited method is a water-soluble alkylene oxide branched polyhydroxyetheramine or a salt thereof, wherein the alkylene oxide branched polyhydroxyetheramine is prepared by reacting a diepoxide with one or more alkylene oxide functionalized amines and one or more amines having two reactive hydrogen atoms and optionally reacting the resulting polyhydroxyetheramine with an acid or alkylating agent of formula $R_{14}X$ where R_{14} is C_1 - C_4 alkyl and X is halogen, sulfate or sulfonyl to form the salt. See claim 1.

As noted by the Examiner, the diepoxide can read on the diepoxide of Treybig and the alkylene oxide functionalized amines and amines having two reactive hydrogen atoms on the amine having two reactive hydrogen according to Treybig.

The polymer of this invention, however, does not comprise the reaction product of the polyhydroxyetheramine with an N-alkylating agent as disclosed by Treybig. In order to further differentiate the optional salts of the polymer of this invention from the polymer of Treybig, Applicant has amended claim 1 to recite that the salts are prepared from an acid or an alkyl halide of formula R_{14} is C_1 - C_4 alkyl and X is halogen, sulfate or sulfonyl.

Nalco Docket No.: 7726-NES

Customer No. 000049459

Accordingly, as Treybig discloses a different polymer than the polymer of this invention, Applicant respectfully requests withdrawal of the rejection of claims 1, 2, 4-8, 12-17, 19, 20, 29 and 31 under 35 U.S.C. § 102(e) over Treybig.

The Rejection of Claims 1, 3, 10 and 11 under 35 U.S.C. § 102(b) over U.S. Patent 4,396,499

Claims 1, 3, 10 and 11 are rejected under 35 U.S.C. § 102(b) over U.S. Patent 4,396,499 ("McCoy"). In particular, the Examiner states:

McCoy discloses a demulsifier for subterranean formations (abstract and Column 1 Lines 22-25). Said demulsifier is prepared by the reaction between polyoxyalkylene diamines and diepoxides. The polyoxyalkylene diamine can be a JEFFAMINE as in Example 1, which has both alkylene oxide moieties and an amine with 2 reactive hydrogens. Use of a 1 wt% of the demulsifier is used as disclosed in Example X1, thus meeting the requirements for Claim 1. The diepoxide is disclosed in Column 2 Line 44 to be diglycidyl ether of Bisphenol A, meeting the requirements for Claims 3, 10 and 11.

Office Action at page 4.

Applicant respectfully traverses this rejection.

Applicant respectfully asserts that the polymer of this invention is the result of the reaction product of at least three components: (1) a diepoxide; (2) one or more alkylene oxide functionalized amines; and (3) one or more amines having two reactive hydrogen atoms. The polymer according to McCoy does not incorporate the amine having two reactive hydrogen atoms.

Applicant further respectfully asserts that the JEFFAMINE of Example 1, cited by the Examiner, does not fit the definition of either an alkylene oxide functionalized amine because it has four reactive N-H groups rather than two, specification at page 3, lines 10-15, or the definition of an amine having two reactive hydrogen atoms because it has four reactive hydrogen atoms rather than two and contains the alkylene oxide functionality which the amine having two reactive hydrogen atoms does not, specification at page 3, lines 16-23. Applicant respectfully asserts that a polymer prepared from a single amine having both two reactive hydrogen atoms and alkylene oxide functionalization as suggested by the Examiner is per se different from a polymer prepared from two

Nalco Docket No.: 7726-NES

Customer No. 000049459

different amines, only one of which contains the alkylene oxide functionalization and both of which contain two reactive hydrogen atoms.

Accordingly, as McCoy discloses a different polymer than the polymer of this invention, Applicant respectfully requests withdrawal of the rejection of claims 1, 3, 10 and 11 under 35 U.S.C. § 102(e) over McCoy.

The Rejection of Claims 26, 27 and 28 under 35 U.S.C. § 102(b) over U.S. Patent 5,760,108

Claims 26, 27 and 28 are rejected under 35 U.S.C. § 102(b) over U.S. Patent 5,760,108 ("Arora"). In particular, the Examiner states:

Arora discloses a curable epoxy resin ester 35-45% resin ester and 25-35% each of water and organic cosolvent (Column 14 Lines 45-49). The resin ester is an amine-epoxy adduct with a polyhydric phenol and epoxy resin (Column 13 Lines 7-8) and the use of polyoxyalkyleneamines is disclosed in Column 6 Lines 14-Column 9 Line 47. A polyoxyalkyleneamine having alkylene oxide adducts and 2 reactive hydrogen atoms is disclosed in column 8 Line 56. The cosolvent stabilizes the dispersion of the resin (Column 13 Line 43) and can include the use of dipropylene glycol butyl ether (Column 13 Line 62), as required for Claims 26-28.

Office Action at page 5.

Applicant respectfully traverses this rejection.

Applicant respectfully asserts that Arora discloses curable epoxy resin esters prepared by:

- I. reacting (a) an epoxy resin, (b) a polyhydric phenol, and (c) an amine-epoxy adduct, wherein the amine-epoxy adduct is formed upon contacting an aliphatic polyepoxide and a polyoxyalkyleneamine.
- II. reacting (a) an epoxy resin with (b) a polyoxyalkyleneamine; or
- III. reacting (a) an epoxy resin, (b) an amine-epoxy adduct, and optionally (c) a polyhydric phenol, wherein the amine-epoxy adduct is prepared as described above. Col. 4, line 43 to col. 5, line 15.

As discussed above, the polyhydroxyetheramine of this invention is the reaction product of at least three components: (1) a diepoxide; (2) one or more alkylene oxide functionalized amines; and (3) one or more amines having two reactive hydrogen atoms.

Nalco Docket No.: 7726-NES

Customer No. 000049459

Applicant respectfully asserts that while the epoxy resin, and amine-epoxy adduct used to prepare the epoxy resin ester according to Arora can read on two components of the claimed polyhydroxyetheramine, the epoxy resin esters of Arora are different in that resin ester I above includes a polyhydric phenol which is not incorporated in the claimed polyhydroxyetheramine, resin ester III above includes an additional epoxy resin and the optional polyhydric phenol which are not incorporated in the claimed polyhydroxyetheramine and none of resin esters I, II and III incorporate the claimed amine having two reactive hydrogen atoms.

Accordingly, as the epoxy resin esters of Arora are different from the claimed polyhydroxyetheramines, Applicant respectfully requests withdrawal of the rejection of claims 26, 27 and 28 under 35 U.S.C. § 102(b) over Arora.

The Rejection of Claims 21 and 22 under 35 U.S.C. § 103(a) over U.S. Patent 6,569,983 in view of U.S. Published Patent Application No. 2003/0008781

Claims 21 and 22 are rejected under 35 U.S.C. § 103(a) over U.S. Patent 6,569,983 ("Treybig") in view of U.S. Published Patent Application No. 2003/0008781 ("Gupta"). In particular, the Examiner states:

Treybig includes elements of the invention as discussed above. Treybig does not disclose the use of clay stabilization salts. Gupta discloses the use of clay stabilization salts in subterranean formulations. Because clay can swell or be dislodged during a fracturing operation, thereby reducing its permeability, said salts are taught by Gupta to be added to a fluid in order to prevent or reduce particulate material from being dislodged during the fracturing operation. Gupta discloses using 2 or 3 weight percent of a stabilization salt, whereby said salt can be ammonium chloride [0006], as required for Claims 21 and 22. It would have been obvious to one of ordinary skill in the art at the time of the invention to include in Treybig the use of stabilization salts, as taught by Gupta, in order to increase or maintain the permeability of the clay in the subterranean formation.

Office Action at page 6.

Applicant respectfully traverses this rejection.

As discussed above, Applicant respectfully asserts that Treybig discloses a different polymer than the claimed polyhydroxyetheramine. Applicant further respectfully asserts that Gupta discloses

Nalco Docket No.: 7726-NES

Customer No. 000049459

an unrelated surfactant composition. As the polyhydroxyetheramine of this invention is novel and nonobvious over the polymer of Treybig and surfactants of Gupta, Applicant respectfully asserts that use of the polyhydroxyetheramine in a known process or in combination with known ingredients such as disclosed by Gupta is likewise novel and nonobvious. Accordingly, Applicant respectfully requests withdrawal of the rejection of claims 21 and 22 under 35 U.S.C. § 103(a) over Treybig in view of Gupta.

The Rejection of Claim 30 under 35 U.S.C. § 103(a) over U.S. Patent 6,569,983 in view of U.S. Patent No. 4,830,827

Claim 30 is rejected under 35 U.S.C. § 103(a) over U.S. Patent 6,569,983 ("Treybig") in view of U.S. Patent No. 4,830,827 ("Au"). In particular, the Examiner states:

Treybig includes elements of the invention as discussed above. Treybig does not include the use of methyl chloride or dimethyl sulfate as an alkylating agent. Au discloses a method of synthesizing novel triazine compounds. Said compounds are alkylated in order to produce the desired triazine derivative (Column 5 Lines 27-29). Alkylating agents that react with the active hydrogen of N moieties are disclosed to be methyl chloride. It would have been obvious to one of ordinary skill in the art at the time of the invention to include in Treybig the use of methyl chloride, as taught by Au, as an alkylating agent in order to prepare a desired end group derivative.

Office Action at pages 6-7.

Applicant respectfully traverses this rejection.

As discussed above, Applicant respectfully asserts that Treybig discloses a branched polyhydroxyetheramine prepared by reacting an amine having two reactive hydrogen atoms with a diepoxide to form a polyhydroxyetheramine and then reacting the polyhydroxyetheramine with an N-alkylating agent to prepare the branched polyhydroxyetheramine. The N-alkylating agent is a compound of formula $R_{11}X$ where R_{11} is C_5 - C_{25} alkyl or alkenyl where the alkyl or alkenyl is optionally substituted with one or more oxygen atoms. Col. 3, line 65 to col. 4, line 16.

In contrast, the polyhydroxyetheramine of claim 30 is a water-soluble alkylene oxide branched polyhydroxyetheramine salt prepared by reacting a diepoxide with one or more alkylene oxide functionalized amines and one or more amines having two reactive hydrogen atoms and then

Nalco Docket No.: 7726-NES

Customer No. 000049459

reacting the resulting polyhydroxyetheramine with an methyl chloride or dimethyl sulfate acid to form the salt.

Applicant respectfully asserts that nothing in Treybig teaches or suggests the equivalence of methyl chloride and dimethyl sulfate with the C₅-C₂₅ alkyl or alkenyl alkylating agents disclosed therein. Applicant further respectfully asserts that nothing in Au teaches or suggests the equivalence of the triazines disclosed therein with the branched polyhydroxyetheramines of Treybig. Accordingly, as there is no disclosure in either Treybig or Au supportive of their combination, Applicant respectfully request withdrawal of the rejection of claim 30 under 35 U.S.C. § 103(a) over Treybig in view of Au.

The Rejection of Claims 23 and 24 under 35 U.S.C. § 103(a) over U.S. Patent 6,569,983 ("Treybig")
in view of U.S. Patent 5,779,405 ("Bruhnke")

Claims 23 and 24 are rejected under 35 U.S.C. § 103(a) over U.S. Patent 6,569,983 ("Treybig") in view of U.S. Patent 5,779,405 ("Bruhnke"). In particular, the Examiner states:

Treybig includes elements of the invention as discussed above. Treybig does not disclose the use of an aqueous composition of polyhydroxyetheramine with 0.005 to 2 weight percent of solubilizing agent. Bruhnke discloses a cleaner composition with a reactive dye colorant. Said cleaner contains 0-35% solvent and 1 to 5000 ppm of a polyoxyalkylene-substituted colorant (Column 4 Lines 10-14). Said colorant contains JEFFAMINE groups, which are polyhydroxyetheramines containing alkylene oxide units and 2 active hydrogens (Column 10 Lines 17-42). Bruhnke discloses the addition of solvent as a solubilizing agent to the cleaner. Said solubilizing agents include ethylene glycol monobutyl ether (Column 3 Lines 34-35), as required by Claims 23 and 24. It would have been obvious to one of ordinary skill in the art at the time of the invention to include in Treybig the use of solubilizing agents as taught by Bruhnke, in order to increase the solubility of the polyhydroxyetheramine and to keep the solution homogeneous.

See MPEP 2144.05, "A prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a prima facie case of obviousness". In re Peterson, 315 F.3d 1325, 65 USPQ2d 1379 1382-93.

Office Action at page 7.

Applicant respectfully traverses this rejection.

Nalco Docket No.: 7726-NES

Customer No. 000049459

As discussed above, Applicant respectfully asserts that Treybig discloses a different polymer. Applicant further respectfully asserts that Bruhnke discloses a cleaning composition comprising a colorant of formula ABXYZ and optionally a solvent. With regard to the colorant, none of the groups A, B, and X read on any component of Applicant's polyhydroxyetheramine. With regard to the solvent, in addition to polar solvents such as ethylene glycol monobutyl ether, noted above by the Examiner, which would serve to solubilize the polyhydroxyetheramines, Bruhnke also discloses nonpolar solvents such as kerosene, mineral spirits, pine oil, wax, white spirits, and the like which would not.

Accordingly, as Bruhnke discloses optional solvents for unrelated compounds Applicant respectfully asserts that there is no incentive to combine its disclosure with the disclosure of Treybig. Applicant further respectfully asserts that Bruhnke provides no basis for selecting certain solvents from among the laundry list of optional solvents disclosed therein and using the solvents in the claimed amounts. Finally, Applicant respectfully asserts that as the claimed polyhydroxyetheramines differ from both the polymers according to Treybig and the colorants according to Bruhnke there is no incentive to judiciously apply the teachings of either to thereby arrive at the claimed composition. Applicant therefore respectfully requests withdrawal of the rejection of claims 23 and 24 under 35 U.S.C. § 103(a) over Treybig in view of Bruhnke.

The Rejection of Claims 18 and 32 under 35 U.S.C. § 103(a) over U.S. Patent 6,569,983

Claims 18 and 32 are rejected under 35 U.S.C. § 103(a) over U.S. Patent 6,569,983 ("Treybig"). In particular, the Examiner states:

7. Claims 18 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Treybig. Treybig includes elements of the invention as discussed above. Treybig does not explicitly disclose the reaction of an alkylene oxide amine which has 2 reactive hydrogens and a second amine having 3 or more reactive hydrogen atoms to form a first product and then reacting this product with a third polyhydroxyetheramine to form the final product, as required in Claim 18, nor the use of this method with an alkylating agent, as required for Claim 32. Treybig discloses branched polyhydroxyetheramines to have superior oil-water performance in Example 11. It would have been obvious to one of ordinary skill in the art at the time of the invention to further increase branching, by adding sequential reactions of

Nalco Docket No.: 7726-NES

Customer No. 000049459

polyhydroxyetheramines, as taught by Treybig in Claim 9 and Example 11, in order to further improve the oil-water performance of the polyhydroxyetheramine.

Examiner notes Applicants Examples beginning on Page 17 of Specification to disclose making a solution of a polyhydroxyetheramine *purchased* from Dow Chemical Comp as the polyhydroxyetheramine of his invention. Applicant does not further modify or improve this Dow product, nor does applicant disclose what the product, or the structure of the product is.

Office Action at page 8.

Applicant respectfully traverses this rejection.

As discussed above, Applicant respectfully asserts that Treybig discloses a branched polyhydroxyetheramine prepared by reacting an amine having two reactive hydrogen atoms with a diepoxide to form a polyhydroxyetheramine and then reacting the polyhydroxyetheramine with an N-alkylating agent to prepare the branched polyhydroxyetheramine. The N-alkylating agent is a compound of formula $R_{11}X$ where R_{11} is C_5 - C_{25} alkyl or alkenyl where the alkyl or alkenyl is optionally substituted with one or more oxygen atoms. Col. 3, line 65 to col. 4, line 16. The preparation of polyhydroxyetheramines comprising secondary, tertiary or ditertiary amine end groups is disclosed at col. 6, lines 48. Applicant respectfully asserts that the polymer of this invention, however, does not comprise the reaction product of the polyhydroxyetheramine with a C_5 - C_{25} alkyl or alkenyl N-alkylating agent as disclosed by Treybig.

Finally, as noted by the Examiner, Treybig does not disclose an amine having three or more reactive hydrogen atoms or preparation of a polyhydroxyetheramine comprising secondary amine, tertiary amine or ditertiary amine end groups by reacting a diepoxide with one or more alkylene oxide functionalized amines and one or more amines having two reactive hydrogen atoms and the amine having 3 or more reactive hydrogen atoms to form the water-soluble alkylene oxide branched polyhydroxyetheramine and then reacting the water-soluble alkylene oxide branched polyhydroxyetheramine with an one or more amines having one or two reactive hydrogen atoms.

Accordingly, as Treybig does not teach or suggest the claimed polyhydroxyetheramines which do not incorporate C_5 - C_{25} alkyl or alkenyl N-alkylating agent, the amine having three or more reactive hydrogen atoms and the final addition of one or more amines having one or two reactive

Nalco Docket No.: 7726-NES

Customer No. 000049459

hydrogen atoms, Applicant respectfully requests withdrawal of the rejection of claims 18 and 32 under 35 U.S.C. § 103(a) over Treybig.

The Nonstatutory Obviousness-Type Double Patenting Rejection of Claims 29 and 31

Claims 29 and 31 are rejected on the ground of nonstatutory obviousness-type double patenting over claims 1, 2, 8 and 9 of U.S. Patent No. 6,569,983.

Applicant respectfully traverses this rejection.

As discussed above, Applicant respectfully asserts that Treybig discloses a branched polyhydroxyetheramine prepared by reacting an amine having two reactive hydrogen atoms with a diepoxide to form a polyhydroxyetheramine and then reacting the polyhydroxyetheramine with an N-alkylating agent to prepare the branched polyhydroxyetheramine. The N-alkylating agent is a compound of formula $R_{11}X$ where R_{11} is C_5 - C_{25} alkyl or alkenyl where the alkyl or alkenyl is optionally substituted with one or more oxygen atoms. Col. 3, line 65 to col. 4, line 16.

The polymer used in the recited method is a water-soluble alkylene oxide branched polyhydroxyetheramine or a salt thereof, wherein the alkylene oxide branched polyhydroxyetheramine is prepared by reacting a diepoxide with one or more alkylene oxide functionalized amines and one or more amines having two reactive hydrogen atoms and optionally reacting the resulting polyhydroxyetheramine with an acid or alkylating agent of formula $R_{14}X$ where R_{14} is C_1 - C_4 alkyl and X is halogen, sulfate or sulfonyl to form the salt. See claim 1.

Accordingly, as the alkylating agents of Treybig and the claimed alkylating agents are chemically distinct, Applicant respectfully asserts that claims 29 and 31 are patentably distinct from claims 1, 2, 8 and 9 of Treybig and therefore respectfully requests withdrawal of the obviousness-type double patenting rejection.

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Nalco Docket No.: 7726-NES

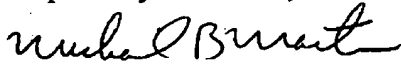
DEC 04 2006

Customer No. 000049459

CONCLUSION

In view of the foregoing amendment and remarks, Applicant respectfully requests withdrawal of the rejections under 35 U.S.C. §§ 102(b) and 103(a) and the nonstatutory obviousness-type double patenting rejection and respectfully asserts that this application is in condition for allowance. Early notice to this effect is earnestly solicited.

Respectfully Submitted,



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12/4/06